

# Watergy – A system for interconnecting water and energy technologies

As part of “H-Disnet”, a EU Horizon 2020 project, the Technical University of Berlin is cooperating with the Berlin-based company Watergy GmbH to carry out research into a building energy system that includes rooftop and facade greenhouses.

Humid air is produced in buildings as a result of taking showers, cooking, drying clothes and also transpiration of residents and indoor plants. This humidity contains latent heat energy that is usually lost when ventilation is carried out. To improve energy efficiency and air quality, the humidity is absorbed by a salt solution. Germs and dust in the supply air and indoor air are also absorbed by the salt solution and are neutralised or removed by a water filter. Heat and water vapour from a rooftop or facade greenhouse can also be absorbed and fed to a heat pump. The use of water vapour allows for the transfer of solar thermal energy at low temperatures and thus delivers high efficiencies for the collector and heat pump system.

In summer, the same liquid desiccant system can be combined with evaporative cooling to provide air-conditioning for the building. In the case of closed operation, the greenhouse can be run at increased CO<sub>2</sub> concentrations to improve yields. In addition, water can be recovered from condensation. For example, the recovery and purification of pre-treated greywater by means of evaporation in a greenhouse is one possible approach. A closed water cycle then results.

#### What can this technology be used for?

- Heat recovery and humidity regulation in buildings
- Building cooling with water as a renewable energy source
- Climate envelope as a solar collector
- Climate envelope for the production of clean water
- Climate envelope as a closed greenhouse for sustainable crop-growing
- Climate envelope as an urban habitat and for improved noise abatement



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- 1** The Watergy absorber box for controlled absorption of heat and humidity from the air using a hygroscopic salt solution.
- 2** Closed greenhouses require a lot of air-conditioning, but also offer significantly increased plant growth due to CO<sub>2</sub> enrichment as well as the opportunity to recover water by means of combined evaporation and condensation.
- 3** Once energy-related refurbishment has been carried out, solar facades and rooftop greenhouses can achieve further energy savings of around 50%.

Further information:  
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> **Research for ecological building concepts**